



Standard Test Method for Evaluation of Conductive and Compressive Heat Resistance (CCHR)¹

This standard is issued under the fixed designation F1060; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This test method is used to measure the thermal insulation of materials used in protective clothing when exposed for a short period of time to a hot surface with a temperature up to 600°F (316°C).

1.2 This test method is applicable to materials used in the construction of protective clothing, including, but not limited to: woven fabrics, knit fabrics, battings, sheet structures, and material composites, intended for use as clothing for protection against exposure to hot surfaces.

1.3 This test method should be used to measure and describe the properties of materials, products, or assemblies in response to heat under controlled laboratory conditions and should not be used to describe or appraise the thermal hazard or fire risk of materials, products, or assemblies under actual exposure conditions.

1.4 The values as stated in SI units are to be regarded as the standard. The values in parentheses are given for information only.

1.5 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:²

D123 Terminology Relating to Textiles

D1776/D1776M Practice for Conditioning and Testing Textiles

D4391 Terminology Relating to The Burning Behavior of Textiles

¹ This test method is under the jurisdiction of ASTM Committee F23 on Personal Protective Clothing and Equipment and is the direct responsibility of Subcommittee F23.80 on Flame and Thermal.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

F1494 Terminology Relating to Protective Clothing

3. Terminology

3.1 *Definitions*—In testing thermal protection clothing material, the response to hot surface contact is indicated by the following descriptive terms:

3.1.1 *charring*—the formation of a carbonaceous residue as the result of pyrolysis or incomplete combustion.

3.1.2 *embrittlement*—the formation of a brittle residue as a result of pyrolysis or incomplete combustion.

3.1.3 *heat flux*—the thermal intensity indicated by the amount of energy transmitted divided by area and time, W/m² (cal/cm²·s).

3.1.4 *human tissue heat tolerance (heat tolerance)*—in the testing of thermal protective materials, the amount of thermal energy predicted to cause a second-degree burn injury in human tissue.

3.1.5 *ignition*—the initiation of combustion.

3.1.6 *melting*—a material response evidenced by softening of the polymer.

3.1.7 *shrinkage*—a decrease in one or more dimensions of an object or material.

3.1.8 *sticking*—a material response evidenced by softening and adherence of the material to the surface of itself or another material.

3.1.9 *thermal end point*—in the testing of thermal protective materials, the point where the copper slug calorimeter sensor response (heat energy measured) intersects with a predicted skin burn injury model.

3.2 For all terminology related to protective clothing, see Terminology **F1494**.

3.3 For definitions of other textile terms used in this test method, refer to Terminology **D123**.

4. Summary of Test Method

4.1 This test method measures the performance of insulative materials. A material is placed in contact with a standard hot surface. The amount of heat transmitted by the material is compared with the human tissue tolerance and the obvious effects of the heat on the material are noted.